Appl. No. : **10/601,321**
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THE CLAIMS

1. (Original) A device comprising:

at least two computational elements, each computational element being shaped as a ring-like structure, wherein each computational element is magnetically coupled to at least one adjacent computational element; and

an interface structure configured to provide magnetic access to the computational elements.

2. (Original) The device of claim 1, wherein said ring-like structure comprises a ring having a single hole therein.

3. (Original) The device of claim 2, wherein said ring comprises a superconducting material of type I.

4. (Original) The device of claim 1, wherein said computational element is magnetically coupled with the at least one adjacent computational element by sharing the core of a transformer.

5. (Canceled)

6. (Original) The device of claim 1, wherein the interface structure comprises at least one input-output element, and wherein each of said input-output elements is magnetically coupled to an adjacent computational element.

7. (Original) The device of claim 1, wherein the interface structure comprises:

at least one input element and at least one output element, said input element and said output element being magnetically coupled to an adjacent computational element.

8. (Original) The device of claim 6, wherein said input-output element is configured as a semi-closed ring.

9. (Original) The device of claim 7, wherein each of said input element and output element is magnetically coupled to an adjacent computational element by sharing the core of a transformer.

10. (Original) The device of claim 1, wherein said computational elements are positioned in a two-dimensional array, and at least one of the computational elements at a border of this two-dimensional array is coupled to an input element, and wherein at least one of the other computational elements at the border of this two-dimensional array is coupled to an output element.

11. (Original) The device of claim 1, wherein each of the at least two computational elements is configured to change its conductive state from superconducting to ohmic conduction in response to a magnetic pulse.

12. (Original) The device of claim 1, further comprising a circuit configured to provide a current to the input element, and another circuit configured to receive a current from the output element.

13. (Original) The device of claim 1, wherein the ring-like structure is configured as a closed structure to allow a closed current flow therein.

14. (Original) The device of claim 13, wherein the ring-like structure is positioned between the interface structure and another interface structure, and wherein each interface structure comprises a semi-closed ring shaped element.

15. (Original) The device of claim 14, wherein one of the semi-closed ring shaped elements operates as in input for receiving a time-dependent current signal, and the other semi-closed ring shaped element operates as an output for outputting a current signal.

16. (Original) The device of claim 15, wherein the time-dependent current signal is indicative of information in a quantum system.

17. (Original) The device of claim 1, wherein the computational element comprises a topological space of genus 1.

18. (Original) The device of claim 1, wherein the device comprises a quantum computer.

19. (Original) The device of claim 1, wherein each of the at least two computational elements comprises a closed-ring structure having a single hole.

20. (Original) The device of Claim 19, wherein the at least two closed-ring structures are magnetically coupled to compute information.

21. (Canceled).

22. (Canceled).

23. (Canceled).

24. (Canceled).

25. (Previously Presented) A device comprising,

at least two computational elements, each computational element being shaped as a ring-like structure, wherein each computational element is magnetically coupled to at least one adjacent computational element by sharing the core of a transformer, said core comprising a permalloy; and

an interface structure configured to provide magnetic access to the computational elements.

26. (Previously Presented) A device comprising:

at least two quantum computational elements, each quantum computational element being shaped as a ring-like structure, wherein each quantum computational element is magnetically coupled to at least one adjacent quantum computational element; and

an interface structure configured to provide magnetic access to the quantum computational elements.

27. (Previously Presented) The device of claim 26, wherein the ring-like structure comprises a ring having a single hole therein.

28. (Previously Presented) The device of claim 27, wherein the ring comprises a superconducting material of type I.

29. (Previously Presented) The device of claim 26, wherein each quantum computational element is magnetically coupled with the at least one adjacent quantum computational element by sharing the core of a transformer.

30. (Previously Presented) The device of claim 29, wherein the core comprises a permalloy.

31. (Previously Presented) The device of claim 26, wherein the interface structure comprises at least one input-output element, and wherein each of said input-output elements is magnetically coupled to an adjacent quantum computational element.

32. (Previously Presented) The device of claim 26, wherein the interface structure comprises:

at least one input element and at least one output element, the input element and the output element being magnetically coupled to an adjacent quantum computational element.

33. (Previously Presented) The device of claim 31, wherein the input-output element is configured as a semi-closed ring.

34. (Previously Presented) The device of claim 32, wherein each input element and output element is magnetically coupled to an adjacent quantum computational element by sharing the core of a transformer.

35. (Previously Presented) The device of claim 26, wherein the quantum computational elements are positioned in a two-dimensional array, and at least one of the quantum computational elements at a border of this two-dimensional array is coupled to an input element, and wherein at least one of the other quantum computational elements at the border of this two-dimensional array is coupled to an output element.

36. (Previously Presented) The device of claim 26, wherein each of the at least two quantum computational elements is configured to change its conductive state from superconducting to ohmic conduction in response to a magnetic pulse.

37. (Previously Presented) The device of claim 26, further comprising a circuit configured to provide a current to the input element, and another circuit configured to receive a current from the output element.

38. (Previously Presented) The device of claim 26, wherein the ring-like structure is configured as a closed structure to allow a closed current flow therein.

39. (Previously Presented) The device of claim 38, wherein the ring-like structure is positioned between the interface structure and another interface structure, and wherein each interface structure comprises a semi-closed ring shaped element.

40. (Previously Presented) The device of claim 39, wherein one of the semi-closed ring shaped elements operates as in input for receiving a time-dependent current signal, and the other semi-closed ring shaped element operates as an output for outputting a current signal.

41. (Previously Presented) The device of claim 40, wherein the time-dependent current signal is indicative of information in a quantum system.

42. (Previously Presented) The device of claim 26, wherein the quantum computational element comprises a topological space of genus 1.

43. (Previously Presented) The device of claim 26, wherein the device comprises a quantum computer.

44. (Previously Presented) The device of claim 26, wherein each of the at least two quantum computational elements comprises a closed-ring structure having a single hole.

45. (Previously Presented) The device of Claim 44, wherein the at least two closed-ring structures are magnetically coupled to compute information.